MASTERING THE HP-12C

THREE

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MASTERING THE HP-12C

BOOK I, BOOK II, or BOOK III

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PREFACE

This book is the product of several years of standing in the front of a classroom presenting seminars to patient students. Throughout the many hours of discussing today's business technology with them never once have they publicly expressed their unwillingness to learn more about the fantastic devices readily available to make their work easier. This book and the others in the series are dedicated to them.

But in addition to the students I must also thank the groups or individuals among whom have allowed me to even attempt this effort. At the top of the list is Ralph Hillier. Without his expertise and creativity and professionalism in presenting seminars I doubt I would find this business such a rewarding career. Let me also thank the people of Hewlett-Packard for their unselfish encouragement and support including my teacher Mike Curran of Hewlett-Packard, Wilsonville, Oregon and Marcia Paxton of Hewlett-Packard, Corvallis, Oregon.

Finally, without the support, humor and patience of Debbie and Megan; and the understanding of the MacGilvary Clan none of this would have meaning.

R.F.
Portland, Oregon
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MASTERING THE HP-12C

BOOK THREE

PROGRAMMING

I. PROGRAMMING BASICS

A. Why use programs?

1. Free the operator from having to perform repetetive calculations

2. Once programmed the HP-12C can act independently, running programs very much like a small personal computer, with all the benefits of those devices

B. Programs and the HP-12C

1. In a sense all of the keys are pre-programmed

2. Programming in the HP-12C is as easy as writing the manual keystrokes on paper and then having the calculator memorize them.

II. PROGRAMMING KEYS AND THE KEYBOARD NUMBERING SYSTEM

A. The Programming keys

	HP-12C	HP-38
Program or Run	f P/R (42 31)	g P/R (25 41)
Run or Stop	R/S (31)	R/S (74)
Pause	g PSE (43 31)	g PSE (25 52)
Memory Map	g MEM (43 19)	g MEM (25 51)
Clear Program	f PRGM (42 33)	g CLP (25 34)
Go To	g GTO (43 33)	g GTO (25 42)
Single Step	SST (32)	g SST (25 44)
Back Step	g BST (43 32)	g BST (25 43)
X is less than or = to Y	g X≤Y (43 34)	g X≤Y (25 53)
X is = to 0	g X = 0 (43 35)	g X = 0 (25 54)

III. PROGRAM MEMORY

A. g MEM - Memory map

P - 08 r - 20

B. Memory Allocation

99 = 8 + (13 X 7)

C. Memory Location

00-
01-
02-
03-
04- Fixed program memory
05-
06-
07-
08-

R.9	09-	thru	15-	R.2	58-	thru	64-
R.8	16-	thru	22-	R.1	65-	thru	71-
R.7	23-	thru	29-	R.0	72-	thru	78-
R.6	30-	thru	36-	R 9	79-	thru	85-
R.5	37-	thru	43-	R 8	86-	thru	92-
R.4	44-	thru	50-	R 7	93-	thru	99-
R.3	51-	thru	57-				

D. Registers R 0 thru R 6 are never used for storing program instructions.

The calculator always fills the first 8 registers with instructions then begins filling R.9 and works backward through the registers to complete the storage.

IV. INPUTTING AND RUNNING PROGRAMS

A. The AMORT program

1. Setting the calculator to PRGM mode

HP-12C	HP-38
f P/R (42 31)	g P/R (25 41)

The Display: 00- PRGM

No instructions stored here may be the starting point of programs.

2. Clearing PRGM memory

Clearing PRGM memory erases all previous programs. In a sense this procedure is guarded because you must first be in program mode prior to clearing program memory.

HP-12C	HP-38
f PRGM (42 33)	g CLP (25 34)

The Display: 00- PRGM

You are now ready to enter the program into the memory of the calculator.

Key in these keystrokes:

KEYSTROKE	DISPLAY
1	01- 1
f AMORT	02- 42 11
R/S	03- 31
X≶Y	04- 34
R/S	05- 31
RCL PV	06- 45 13
R/S	07- 31
g GTO 01	08- 43,33 01

3. Resetting to Run

HP-12C	HP-38
f P/R (42 33)	g P/R (25 34)

4. Entering required info

KEYSTROKE	DISPLAY
63000 (PV)	63,000.00
14.5 (g 12÷)	1.21
30 (g 12X)	360.00
(PMT)	-771.47

			INT.	PRIN.	RB
(R/S)	(R/S)	(R/S)	-761.25	-10.22	62,989.78
(R/S)	"	"	-761.13	-10.34	62,979.44
(R/S)	"	"	-761.00	-10.47	62,968.97
(R/S)	"	"	-760.88	-10.59	62,958.38
(R/S)	"	"	-760.75	-10.72	62,947.66
(R/S)	"	"	-760.62	-10.85	62,936.81
(R/S)	"	"	-760.49	-10.98	62,925.83
(R/S)	"	"	-760.35	-11.12	62,914.71
(R/S)	"	"	-760.22	-11.25	62,903.46
(R/S)	"	"	-760.08	-11.39	62,892.07
(R/S)	"	"	-759.95	-11.52	62,880.55
(R/S)	"	"	-759.81	-11.66	62,868.89
(RCL n)			372 (360 + 12)		

a. New terms

80000 (PV)	80,000.00
25 (g 12X)	300.00
13.75 (g 12÷)	1.15
(PMT)	-947.73

AMORTIZATION PROGRAM

#	K
01	1
02	FAMORT
03	R/S
04	X≤Y
05	R/S
06	RCL PV
07	R/S
08	g GTO 01

#	K

#	K

#	K

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			INT.	PRIN.	RB
(R/S)	(R/S)	(R/S)	-916.67	-31.06	79,968.94
(R/S)	"	"	-916.31	-31.42	79,937.52
(R/S)	"	"	-915.95	-31.78	79,905.74

B. Analyzing Programs

1. SST - Run Mode (HP-12C)

   a. If the SST is held down the calculator displays the program instruction that will next be executed

   b. If released the calculator will perform the instruction

2. BST - Run mode

   a. HP-12C - Line by line review back through the program

   b. HP-38 - Line by line review of the program

3. SST - PRGM mode

   a. HP-12C - Quick forward program review

   b. HP-38 - One step forward review of program

4. BST - PRGM mode

   a. HP-12C - Quick, reverse review of program instructions

   b. HP-38 - Step by step review back through program instructions

KEYSTROKE	DISPLAY
(SST)	08- 43,33 01
-RELEASE-	79,905.74
(SST)	01- 1
-RELEASE-	1.
(SST)	02- 42 11
-RELEASE-	-915.59

KEYSTROKE	DISPLAY
(g BST)	02- 42 11
-RELEASE-	-915.59
(g BST)	01- 1
-RELEASE-	-915.59
(g BST)	00-
f P/R	00-
(SST)	01- 1 02- 42 11 03- 31 04- 34 05- 31 06- 45 13 07- 31 08- 43,33 01 00-
(g BST)	08- 43,33 01 07- 31 06 45 13 05 31 04 34 03 31
(g GTO . 07)	07- 31
(g GTO . 02)	02- 42 11
(g GTO . 05)	05- 31

GTO instructions in PRGM mode must have a decimal point placed prior to the line number or the instruction will be recorded in PRGM memory.

KEYSTROKE	DISPLAY
f P/R	
(g GTO 07)	
f P/R	07- 31
f P/R	
f P/R	

KEYSTROKE	DISPLAY		
(g GTO 02)			
f P/R	02-	42	11

5. Branching and Looping

a. Looping

(g GTO . 08)	08-	43,33	01

The instruction on this line is called a loop because the instruction GTO 01 is lower than the line on which it appears. A loop forces the program to return to a specific place in memory.

In the case of the AMORT program in memory the GTO 01 instruction insures that the program starts at the same location each time we begin to amortize a new period.

b. Branching

Branching forces the program to go to another location in program memory just like looping did above. However branching is commonly used to add instructions once a program is written to enhance the operation of the program.

KEYSTROKE	DISPLAY		
(g BST)	07-		31
(g GTO 15)	08-	43,33	15
CLx	09-		35
Clx	10-		35
Clx	11-		35
Clx	12-		35
CLx	13-		35
Clx	14-		35
RCL n	15-	45	11
1	16-		1
+	17-		40
g PSE	18-	43	31
g GTO 01	19-	43,33	01

AMORTIZATION PROGRAM WITH COUNTER

#	K
01	1
02	f AMORT
03	R/S
04	$x \leq y$
05	R/S
06	RCL PV
07	R/S
08	g GTO 15
09	CLx
10	CLx
11	CLx
12	CLx
13	CLx
14	CLx
15	RCL n
16	1
17	+
18	g PSE
19	g GTO 01

#	K

#	K

#	K

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KEYSTROKE	DISPLAY	
75000 (PV)	75,000.00	
13.5 (g 12÷)	1.13	
30 (g 12X)	360.00	
(PMT)	-859.06	
0 (n)	0.00	
(R/S)	-843.75	Interest
(R/S)	-15.31	Principal
(R/S)	74,984.69	Remaining Balance
(R/S)	2.00 (PAUSE)	
(R/S)	-843.58	Interest 2nd Period

C. Editing Programs

1. Four editing methods

a. Adding at end

Adding new program lines to existing ones without changing the program

b. Adding within

Literally adding program instructions by dropping them into lines occupied by other keystrokes and assigning new locations to the displaced ones

c. Adding by replacement

Substitution of new instructions, elimination of the old ones

d. Adding by branching

Adding instructions to a program in another part of program memory

2. Editing the AMORT program

Our intent is to improve the quality of the AMORT program by enhancing the program steps. We will add pause instructions and storage register arithmetic which will allow us to see total interest and total principal displayed after calculating new values.

KEYSTROKE	DISPLAY
g GTO 03	
f P/R	03- 31
STO + 0	04- 44 40 0
RCL 0	05- 45 0
g PSE	06- 43 31
R↓	07- 33
X⇆Y	08- 34
R/S	09- 31
STO + 1	10- 44 40 1
RCL 1	11- 45 1
g PSE	12- 43 31
RCL PV	13- 45 13
R/S	14- 31
RCL n	15- 45 11
1	16- 1
+	17- 40
g PSE	18- 43 31
g GTO 01	19- 43,33 01
f P/R	

AMORT — TOTAL INTEREST, TOTAL PRINCIPAL

#	K
01	1
02	f AMORT
03	R/S
04	STO+0
05	RCL 0
06	g PSE
07	R↓
08	x≤y
09	R/S
10	STO+1
11	RCL 1
12	g PSE
13	RCL PV
14	R/S
15	RCL n
16	1
17	+
18	g PSE
19	g GTO 01

#	K

#	K

#	K

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D. Running Multiple Programs

You may run as many programs in the HP-12C as will fit into the 99 available spaces. That is, you could conceivably run 3 - 33 line programs or 33 - 3 line programs.

There are some special methods to learn before you will be able to run these programs seperately - without interference from eachother.

1. The Checkbook Balancer Program

KEYSTROKE
ENTER
RCL 0
+
STO 0

We would like to run this program independent of our AMORT program and we would like to have the checkbook program in first position.

Here's how to accomplish these two goals:

- You must first rewrite the programs so that any loops you have included in the programs now reflect their new positions in program memory
- Next, you must enter the two or more programs leaving a space between them so that they do not interfere with eachother.

You will find that these two things have been done for you on the next page. Perform the next two steps then enter the program as it appears on the next page.

KEYSTROKE	DISPLAY
f P/R	00-
f PRGM	00-

CHECKBOOK BALANCER WITH AMORT - TOTAL INTEREST / TOTAL PRINCIPAL

#	K
01	ENTER
02	RCL 0
03	+
04	STO 0
05	SST
06	1
07	f AMORT
08	R/S
09	STO + 0
10	RCL 0
11	g PSE
12	R↓
13	x≷y
14	R/S
15	STO + 1
16	RCL 1
17	g PSE
18	RCL PV
19	R/S
20	RCL n

#	K
21	1
22	+
23	g PSE
24	g GTO 06

#	K

#	K

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V. RUNNING PREWRITTEN PROGRAMS

A. The Rent or Buy Decision (64 lines)
Courtesy Hewlett-Packard Co.

B. Graduated Payment Mortgage Program (77 lines)
Courtesy Hewlett-Packard Co.

C. Growing Equity Mortgage (34 lines)

THE RENT OR BUY DECISION

#	K
00	f CL PRGM
01	FV
02	FV
03	RCL 7
04	%
05	=
06	RCL N
07	STO 0
08	RCL PV
09	f CL FIN
10	RCL 1
11	=
12	PV
13	RCL 3
14	g 12÷
15	RCL 2
16	g 12×
17	PMT
18	R↓
19	R↓

#	K
20	0
21	n
22	RCL 0
23	1
24	2
25	×
26	f AMORT
27	R↓
28	R↓
29	R↓
30	RCL PV
31	+
32	CHS
33	FV
34	R/S
35	R↓
36	RCL n
37	÷
38	RCL 4
39	=

#	K
40	RCL . 0
41	%
42	RCL PMT
43	RCL 4
44	=
45	RCL 5
46	−
47	RCL 8
48	+
49	=
50	CHS
51	PMT
52	RCL 0
53	g 12×
54	RCL 1
55	RCL 6
56	+
57	CHS
58	PV
59	i

#	K
60	RCL g 12÷
61	R/S
62	RCL 9
63	g 12÷
64	FV
	f P/R

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RENT VS. BUY DECISION

Instructions:

1. Key in Prgm	
2. Key in Estimated down payment	Press STO 1
3. Key in life of mortgage	Press STO 2
4. Key in annual mortgage interest rate	Press STO 3
5. Key in the estimated monthly taxes	Press STO 4
6. Key in the total monthly expenses including insurance, maintainence, utility, and improvements	Press STO 5
7. Key in the closing costs	Press STO 6
8. Key in the selling costs including commissions, fees (escrow etc.)	Press STO 7
9. Key in the monthly rent for alternative housing	Press STO 8
10. Key in the savings or alternative investment annual rate of return as a percentage	Press STO 9
11. Key in the combined state and federal marginal tax rate as a percentage	Press STO .0
12. Press f (CL) FIN then key in the number of years involved in the investment	Press n
13. Key in the estimated yearly rate of appreciation as a percentage	Press i
14. Key in the price of the house	Press PV

Results:

R/S 1 ---------- Net Proceeds from the sale of the house (negative number indicates loss
R/S 2 ---------- Yield on the investment
R/S 3 ---------- Value of savings account or other investment

TO REPEAT STORE CHANGED VALUES AND GO TO STEP 12

ERROR 5 - INVESTMENT HAS RESULTED IN A LOSS

		REGISTERS			

GRADUATED PAYMENT MORTGAGE

#	K
00	f CL PRGM
01	g END
02	STO 2
03	x≷y
04	1
05	%
06	1
07	+
08	STO 0
09	RCL n
10	RCL 2
11	−
12	g 12x
13	RCL i
14	g 12÷
15	RCL PV
16	STO 3
17	1
18	CHS
19	PMT

#	K
20	PV
21	CHS
22	FV
23	1
24	g 12x
25	RCL PMT
26	RCL 0
27	÷
28	PMT
29	PV
30	CHS
31	FV
32	1
33	STO + 1
34	RCL 1
35	RCL 2
36	−
37	g x=0
38	g GTO 40
39	g GTO 25

#	K
40	RCL 3
41	RCL PV
42	÷
43	STO 4
44	RCL 3
45	PV
46	1
47	STO 3
48	RCL 3
49	R/S
50	RCL 4
51	1
52	RCL 0
53	RCL 1
54	y^x
55	÷
56	x
57	CHS
58	f RND
59	PMT

#	K
60	R/S
61	FV
62	FV
63	f RND
64	R/S
65	CHS
66	PV
67	1
68	STO + 3
69	STO − 1
70	RCL 1
71	g x=0
72	g GTO 74
73	g GTO 48
74	RCL 4
75	CHS
76	R/S
77	g GTO 76
	f P/R

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GRADUATED PAYMENT MORTGAGE FOR THE HP 38 MODEL CALCULATOR

PROGRAM NAME: GPM

* CHANGES

* PROGRAMMER

#	K
00	g P/R g CLP
01	STO 2
02	x ≥ y
03	1
04	0/0
05	1
06	+
07	STO 0
08	RCL n
09	RCL 2
10	−
11	g 12x
12	RCL i
13	g 12÷
14	RCL PV
15	STO 3
16	1
17	CHS
18	PMT
19	PV

#	K
20	CHS
21	FV
22	1
23	g 12x
24	RCL PMT
25	RCL 0
26	÷
27	PMT
28	PV
29	CHS
30	FV
31	1
32	STO + 1
33	RCL 1
34	RCL 2
35	−
36	g x=0
37	g GTO 39 *
38	g GTO 24 *
39	RCL 3

#	K
40	RCL PV
41	÷
42	STO 4
43	RCL 3
44	PV
45	1
46	STO 3
47	RCL 3
48	R/S
49	RCL 4
50	1
51	RCL 0
52	RCL 1
53	g y^x *
54	÷
55	x
56	CHS
57	F RND
58	PMT
59	R/S

#	K
60	FV
61	FV
62	f RND
63	R/S
64	CHS
65	PV
66	1
67	STO + 3
68	STO − 1
69	RCL 1
70	g x=0
71	g GTO 73 *
72	g GTO 47 *
73	RCL 4
74	CHS
75	R/S
76	g GTO 75 *
	g P/R

GRADUATED PAYMENT MORTGAGES

Instructions:

1. Key in PRGM	
2. Press f (CL) REG or ALL	
3. Key in the term of the loan	Press n
4. Key in the annual interest rate	Press i
5. Key in the total loan amount	Press PV
6. Key in the rate of graduation as a percentage	Press ENTER
7. Key in the total number of years the loan graduates and press	R/S

Results:

R/S 1---------- The current year
R/S 2---------- Monthly payment year 1
R/s 3---------- Remaining balance year 1
R/S 4---------- Goes on to year 2

PROGRAM WILL CONTINUE TILL LEVEL YEAR PAYMENT IS REACHED AND THEN STOP

FOR NEW CASE PRESS GTO 00 in run mode AND KEY IN NEW INFORMATION

		REGISTERS			

GROWING EQUITY MORTGAGE PROGRAM

#	K
01	PMT
02	PMT
03	R/S
04	0
05	n
06	1
07	2
08	f AMORT
09	R/S
10	STO+2
11	x≤y
12	R/S
13	STO+3
14	RCL 2
15	R/S
16	RCL 3
17	R/S
18	RCL PV
19	R/S
20	RCL n

#	K
21	1
22	2
23	+
24	1
25	2
26	÷
27	R/S
28	RCL PMT
29	RCL 1
30	%
31	+
32	R/S
33	PMT
34	g GTO 06

#	K

#	K

Instructions:

1. Set calculator to PRGM mode
2. Clear PRGM memory
3. Enter the program on the next page
4. Reset the calculator to RUN mode
5. Clear the General Purpose Registers
6. Enter the following data:

   a. Enter the percentage quantity of increase in the principal payment and Press STO 1

   b. Enter the periodic term

   c. Enter the periodic interest rate

   d. Enter the Present Value

Results:
(1st year)
R/S ----------First year periodic payment
R/S ----------First year interest paid
R/S ----------First year principal paid
R/S ----------Total interest paid
R/S ----------Total principal paid
R/S ----------Remaining balance end of first year

(Subsequent years)
R/S----------Total years
R/S----------New payment
R/S----------Interest paid current year
R/S----------Principal paid current year
R/S----------Total interest paid
R/S----------Total principal paid
R/S----------Remaining balance end of current year

To repeat with new terms:

1. Press g GTO 00
2. Enter new terms beginning with step 6 above

GROWING EQUITY MORTGAGE
AMORTIZATION TABLE

1	2	3
PMT	PMT	PMT
EOY INT	EOY INT	EOY INT
EOY PR	EOY PR	EOY PR
T INT	T INT	T INT
T PR	T PR	T PR
RB	RB	RB
4	5	6
PMT	PMT	PMT
EOY INT	EOY INT	EOY INT
EOY PR	EOY PR	EOY PR
T INT	T INT	T INT
T PR	T PR	T PR
RB	RB	RB
7	8	9
PMT	PMT	PMT
EOY INT	EOY INT	EOY INT
EOY PR	EOY PR	EOY PR
T INT	T INT	T INT
T PR	T PR	T PR
RB	RB	RB
10	11	12
PMT	PMT	PMT
EOY INT	EOY INT	EOY INT
EOY PR	EOY PR	EOY PR
T INT	T INT	T INT
T PR	T PR	T PR
RB	RB	RB
13	14	15
PMT	PMT	PMT
EOY INT	EOY INT	EOY INT
EOY PR	EOY PR	EOY PR
T INT	T INT	T INT
T PR	T PR	T PR
RB	RB	RB
16	17	18
PMT	PMT	PMT
EOY INT	EOY INT	EOY INT
EOY PR	EOY PR	EOY PR
T INT	T INT	T INT
T PR	T PRIN	T PR
RB	RB	RB

VI. WRITING NEW PROGRAMS

A. 8 Steps to Writing Quality Programs

1. Determine the final result
2. Perform all steps manually in RUN mode
3. Write the program on paper
4. Write the instructions for properly operating the program
5. Write the results of each R/S execution
6. Write explanatory notes describing special circumstances
7. Test the program with real examples
8. File the program for later use

B. Writing an Adjustable Rate Mortgage program

1. Determine the final result(s)
   We wish to show the remaining term and current monthly payment for each year, the annual interest paid, the annual principal paid, and the remaining balance after 12 monthly payments

2. Performing all the steps manually requires we go through one generation of a typical mortgage.

KEYSTROKE	DISPLAY	
30 (g 12X)	360.00	Term
12 (g 12÷)	1.00	Interest
60000 (PV)	60,000.00	Present Value
(PMT)	-617.17	Payment
0 (n)	0.00	
12 (f AMORT)	-7,188.26	Interest Paid
(X$\leftrightarrows$Y)	-217.78	Principal Paid
(RCL PV)	59,782.22	Remaining Balance
348(n)	348.00	Remaining Term
13 (g 12÷)	1.08	New Rate
(PMT)	-663.24	New Payment
12 (f AMORT)	-7,760.13	Interest Paid
(X$\leftrightarrows$Y)	-198.75	Principal Paid
(RCL PV)	59,583.47	Remaining Balance

3. Write the program on paper
   After trying the program manually you can transfer the program to paper. (SEE NEXT PAGE)

ADJUSTABLE RATE MORTGAGE PROGRAM

#	K
01	RCL 1
02	g 12X
03	g PSE
04	RCL g 12X
05	1
06	—
07	STO 1
08	RCL 2
09	RCL 3
10	+
11	g 12÷
12	RCL 4
13	PV
14	PMT
15	R/S
16	1
17	2
18	f AMORT
19	R/S
20	X≤Y

#	K
21	R/S
22	RCL PV
23	STO 4
24	R/S
25	g GTO 01

#	K

#	K

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4. Write the instructions. (SEE BELOW)

   After operating the program manually and editing the steps so that it runs according to your specifications you should write the instructions to the program in legible form. This way you can get the greatest value from the program in the future.

5. Write the results. (SEE BELOW)

   You should know what to expect after each R/S instruction is executed. Again this is so that you can use the program in the future.

6. Write explanatory notes. (SEE BELOW)

   There may be some instances when the program is unsuitable for use. These usage exceptions and any other information that makes the program more valuable should be written here.

7. Test the Program. (SEE BELOW)

   Without adequate testing with real examples the program may fail you at the worst possible time. Make certain the program works by testing it.

ADJUSTABLE RATE MORTGAGE PROGRAM

INSTRUCTIONS : AFTER ENTERING PROGRAM

The following instructions are for use after you have successfully entered and tested your ARM program.

STEP 1 - CLEAR THE MEMORY

Press: (f CLEAR REG)

STEP 2 - ENTER FINANCIAL VALUES

Input term in years: Press (STO 1)

Input index as an annual percentage: Press (STO 2)

Input the margin as an annual percentage: Press (STO 3)

Input the loan amount and: Press (STO 4)

STEP 3 - RUN THE PROGRAM

Press (R/S) -

Display shows - Monthly remaining term (short pause) then monthly payment

Press (R/S) again -

Display shows - Annual interest paid

Press (R/S) again -

Display shows - Annual principal paid

Press (R/S) again -

Display shows - Remaining balance after 12 payments

STEP 4 - ADJUSTING THE TERMS OF THE MORTGAGE

If no change in terms will occur for the next 12 month period go to STEP 3 and repeat the steps shown.

If there is an adjustment to the terms of the mortgage follow either of the next two steps:

1. To change the index key in the new index in annual percentage terms and press (STO 2)

2. To change the margin key in the change in annual percentage terms and press (STO 3)

Either of these two changes, or both, may be performed after the program displays the remaining balance.

After making any required changes go to STEP 3 and follow the instructions for running the program.

STEP 5 - TRY THESE EXAMPLES

Loan amount at origination	$60,000.00
Term of loan	30 Years
Index at time of origination	9.670
Margin at time of origination	2.00
Total rounded interest rate	11.700

KEYSTROKE	DISPLAY
(f CLEAR REG)	0.00
30 (STO 1)	30.00
9.7 (STO 2)	9.70
2 (STO 3)	2.00
60000 (STO 4)	60,000.00

(R/S)	360	Remaining term (Pause)
	-603.35	Monthly Payment
(R/S)	-7,007.80	Annual Interest Paid
(R/S)	-232.40	Annual Principal Paid
(R/S)	59,767.60	Remaining Balance

Let's now assume an adjustment is due in this mortgage

Index at time of adjustment	10.600
Margin at time of adjustment	2.000
Total rounded interest rate	12.600

KEYSTROKE	DISPLAY	
10.6 (STO 2)	10.60	
(R/S)	348	Remaining Term (Pause)
	-644.57	Monthly Payment
(R/S)	-7,518.51	Annual Interest Paid
(R/S)	-216.33	Annual Principal Paid
(R/S)	59,551.27	Remaining Balance End of Two Years

Assuming no change in the next year:

(R/S)	336	Remaining Term (Pause)
	-644.57	Monthly Payment
(R/S)	-7,489.63	Annual Interest Paid
(R/S)	-245.21	Annual Principal Paid
(R/S)	59,306.06	Remaining Balance

C. Conditional tests

1. Conditional test keys

$X \leq Y$ (43 34)

X = 0 (43 35)

2. Conditional tests allow the operator to ask true or false questions within the body of the program. They are sometimes called DO IF TRUE.

3. $X \leq Y$ - X is less than or = to Y

If the answer to the question: Is X less than or equal to Y is true, the calculator executes the next line in program memory

If the answer to the question: Is X less than or equal to Y is false, the calculator skips one line and executes the next.

4. X=0 - X is = to 0

If the answer to the question: Is X equal to zero is true, the calculator executes the next line in program memory

If the answer to the question: Is X equal to zero is false, the calculator skips one line in program memory and executes the next.

5. Conditional tests are extremely useful if you wish to add exceptions to your program. They allow the programmer the option of adding branches and loops based on situations in the program.

D. Adjustable Rate Mortgage Program with Conditional Tests

(See next page)

ADJUSTABLE RATE MORTGAGE PROGRAM

#	K
01	RCL 1
02	g X=0
03	g GTO 05
04	g GTO 07
05	RCL 4
06	R/S
07	g 12 X
08	g PSE
09	RCL g 12X
10	1
11	STO - 1
12	RCL 2
13	RCL 3
14	+
15	g 12÷
16	RCL 4
17	PV
18	PMT
19	g PSE
20	1

#	K
21	2
22	f AMORT
23	g PSE
24	X ≷ Y
25	g PSE
26	RCL PV
27	STO 4
28	g PSE
29	g GTO 01

#	K

#	K

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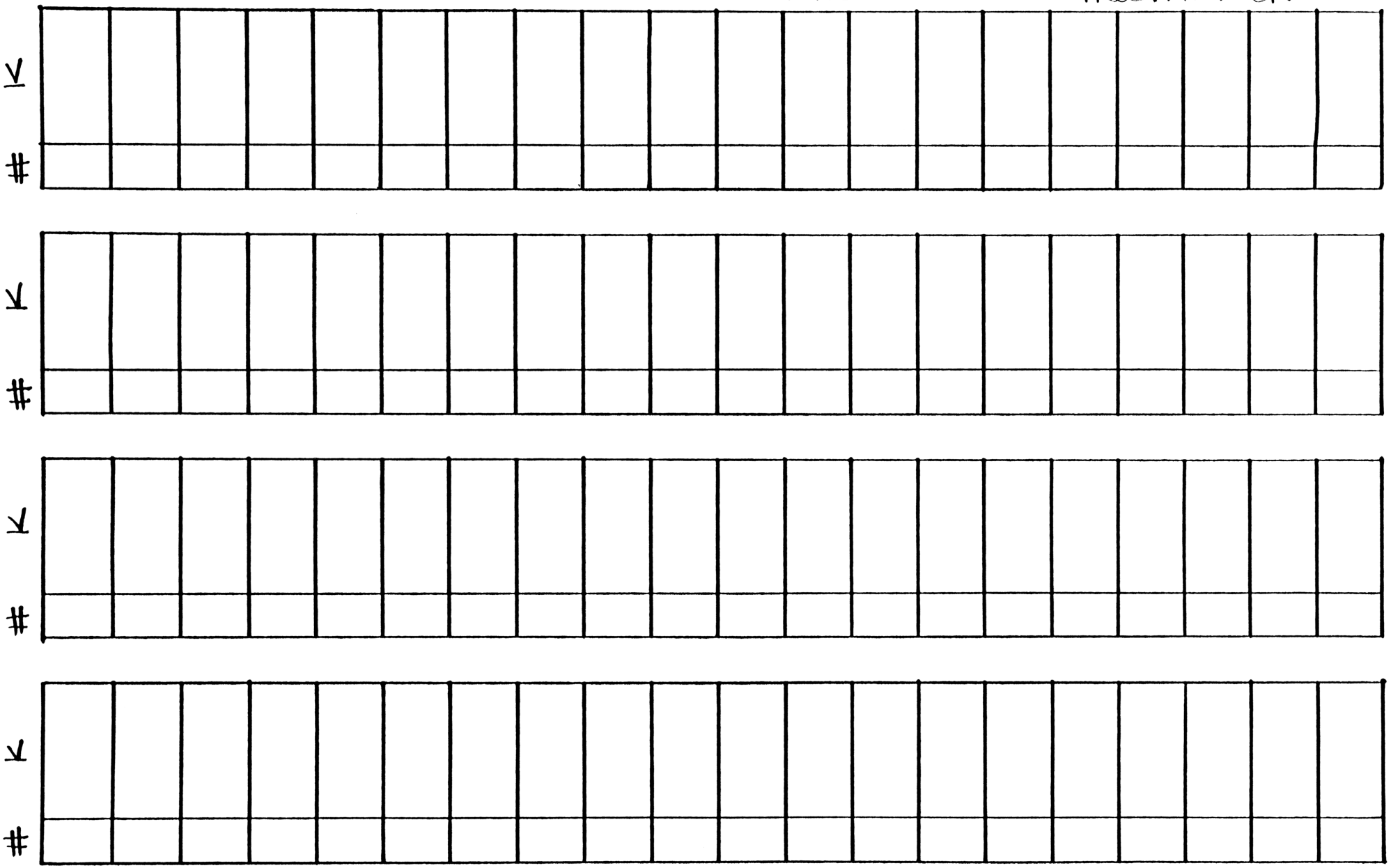
PROGRAM NAME DATE PROGRAMMER



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(H) = HP-12C Owners Handbook (S) = HP-12C Solutions Book

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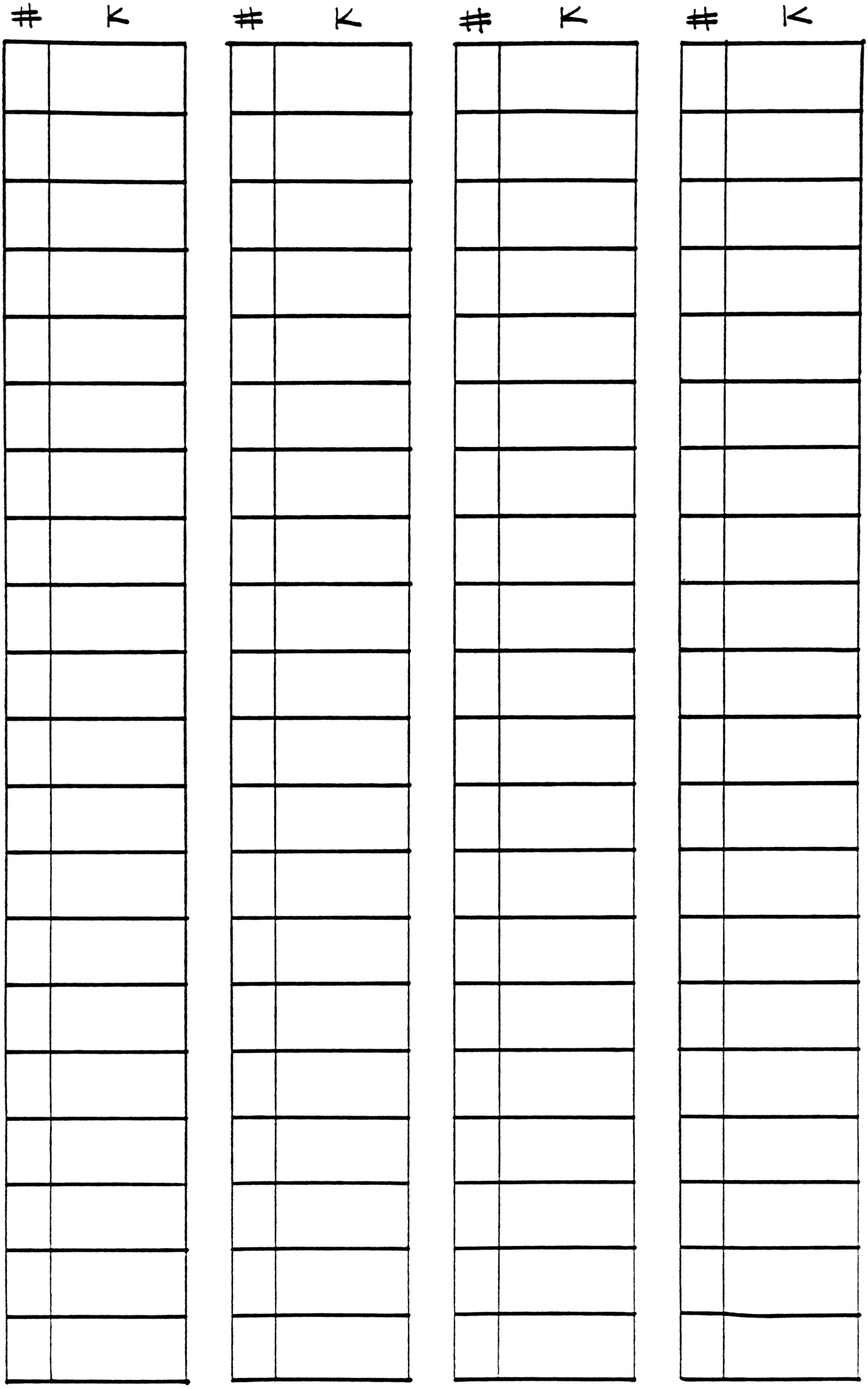
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